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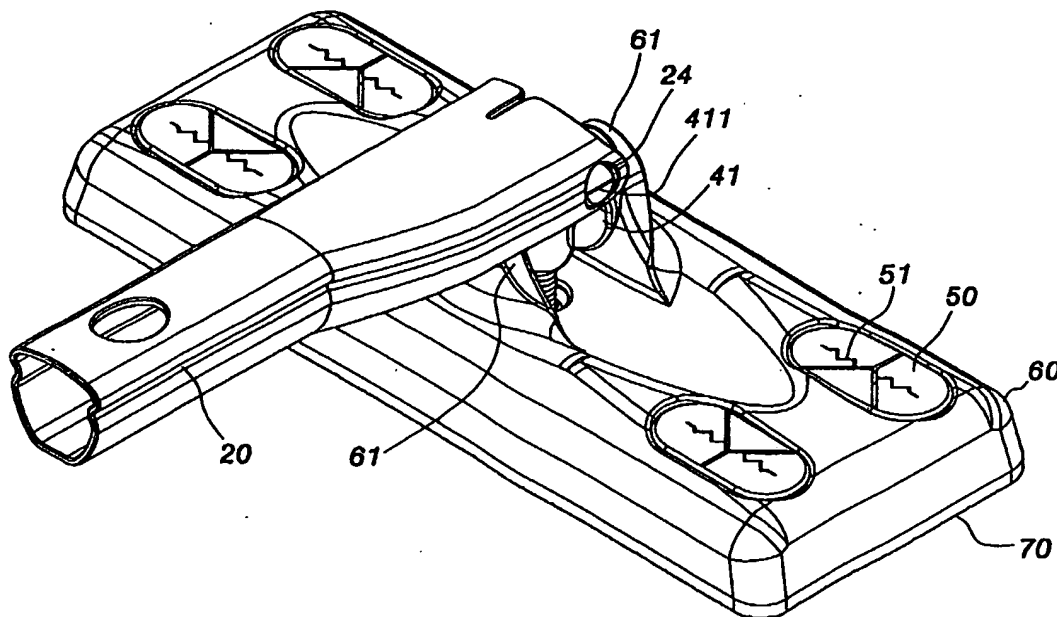
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US 4971471 A

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(54) Abstract Title  
**Pivoting and rotating structure for retaining the cleaning head of a vapour cleaner**

(57) A retaining structure for the brush of a vapour cleaner comprising a hollow sheath pipe 20 with a clamping board 23, a coupling means 22 having a conic part 222 and a guiding groove 223 arranged within the sheath pipe 20, the conic part 222 piercing the clamping board 23 in the sheath pipe 20 and the guiding groove 223 clamping the clamping board 23, a duct 81 having one end connected to the coupling means 22 and a rotation means 40 composed of two semi bodies (41, 42 fig.3) which enclose an outer wall of the duct 81, the rotation means 40 having a top end pivotally connected 411 to a bottom end of the sheath pipe 20, and an upper cover 60 and bottom plate 70.



**FIG. 3**

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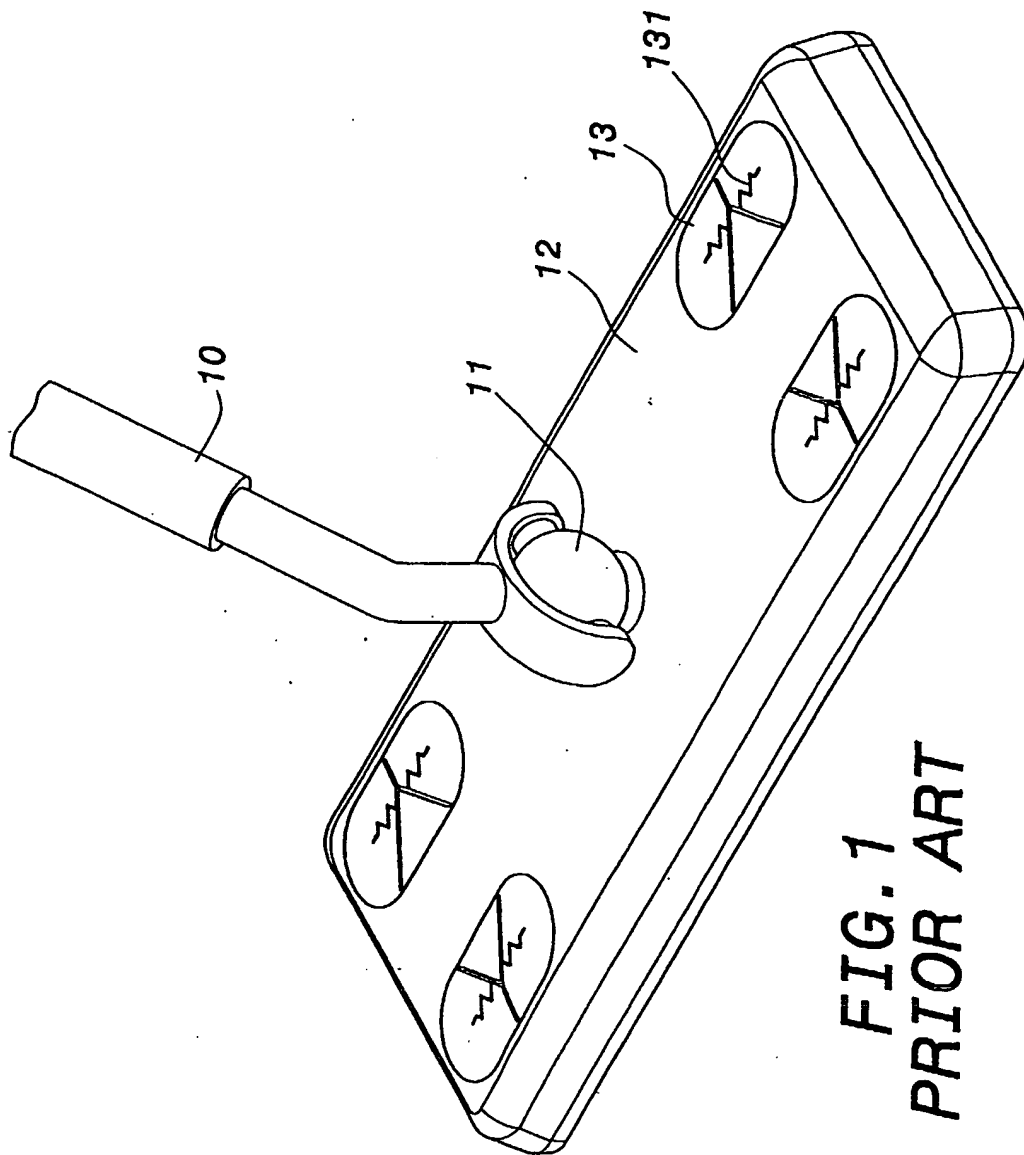


FIG. 1  
PRIOR ART

2/s

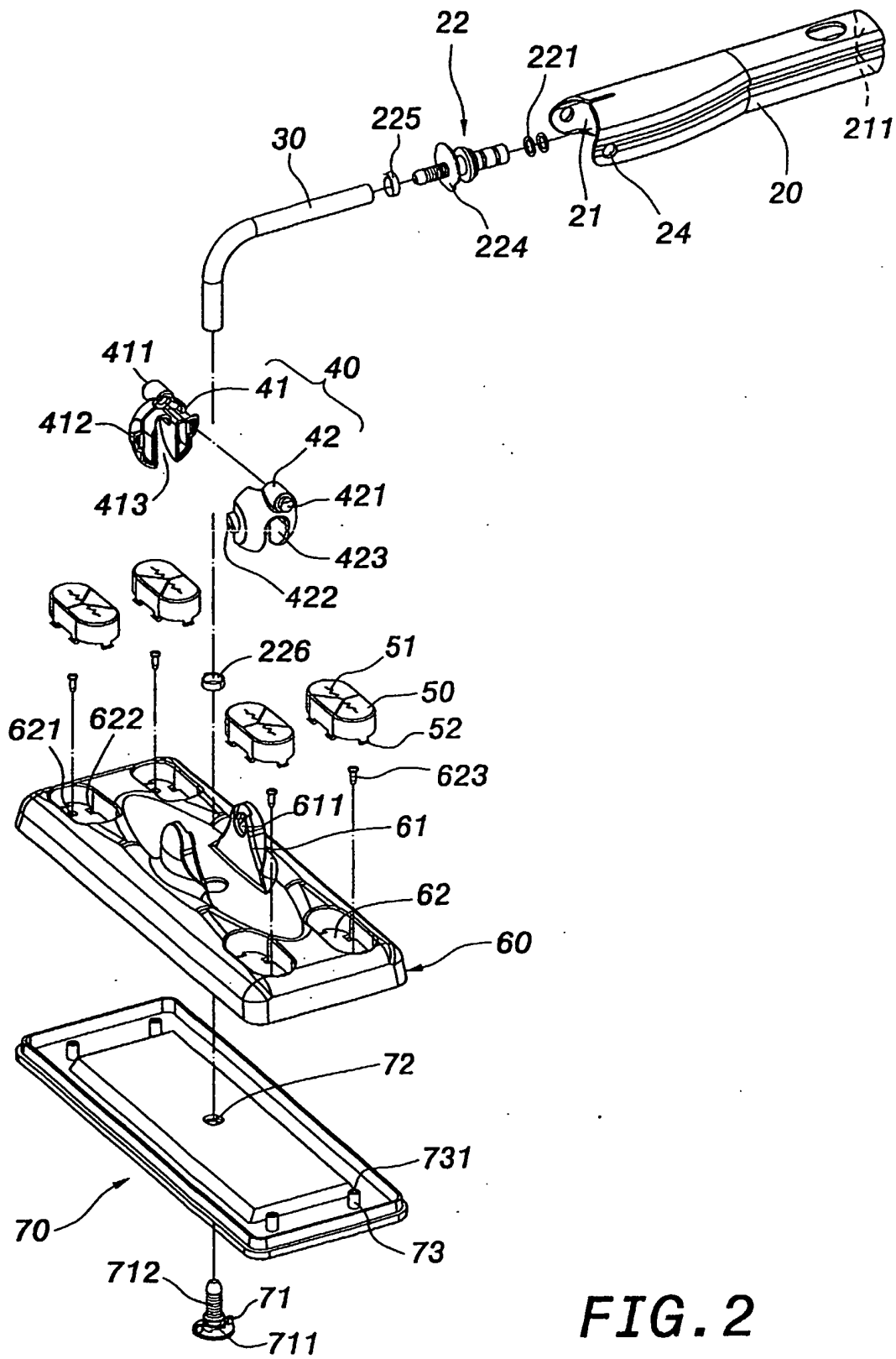


FIG. 2

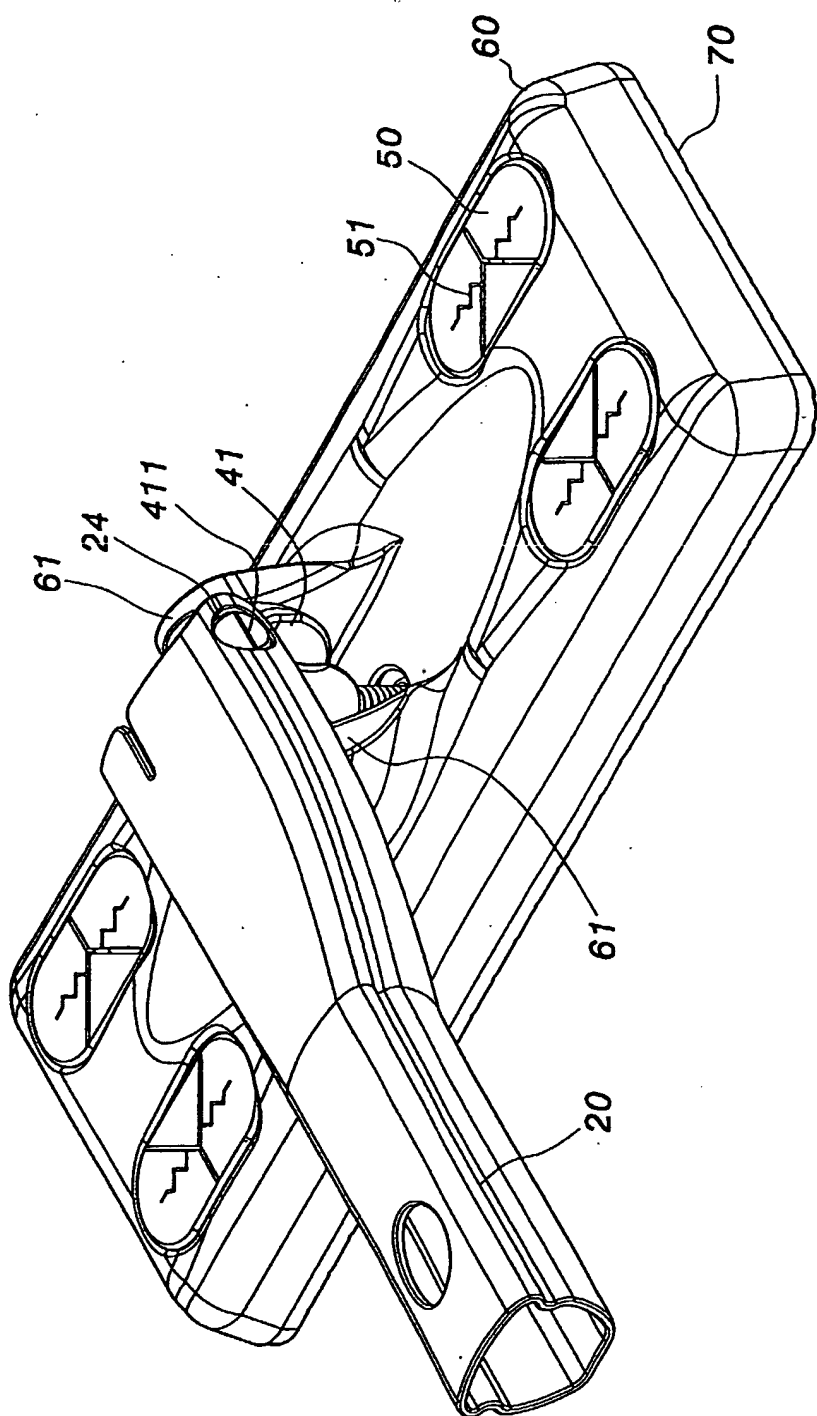


FIG. 3



S/S

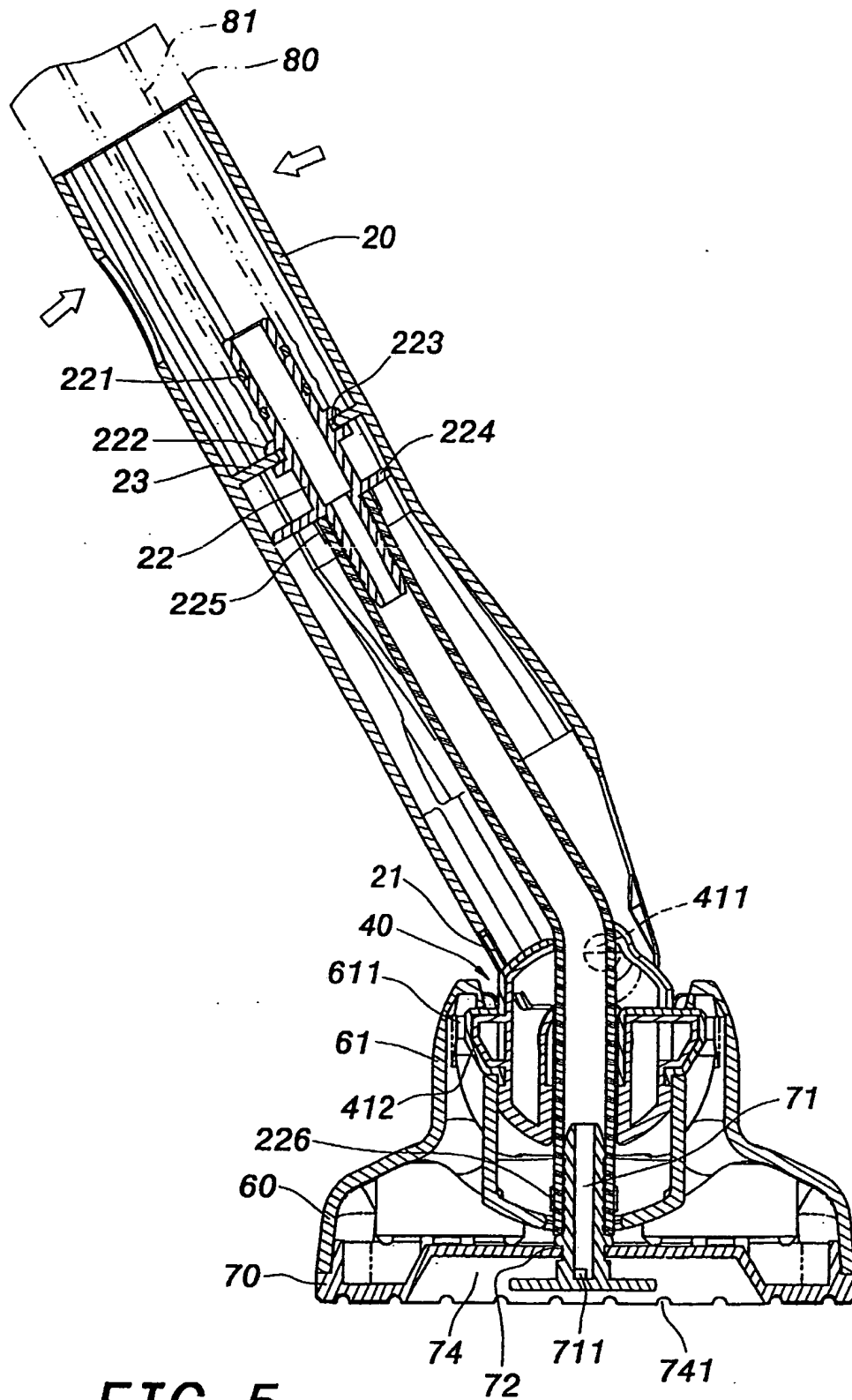


FIG. 5

**RETAINING STRUCTURE FOR BRUSH OF VAPOR CLEANER****Field of the invention**

The present invention relates to a retaining structure for brush of vapor cleaner, especially to a retaining structure for brush arranged at front end of a vapor cleaner and assembled with de-dirt paper or wipe for cleaning.

**Background of the invention**

Fig. 1 shows a prior art mop using de-dirt paper, which includes a shaft 10, a rounded pivot 11, a panel 12 and a plurality of connection units 13. The panel 12 is arranged below the rounded pivot 11. The plurality of connection units 13 are provided atop the panel 12 and a slit 131 is formed atop the connection unit 13 which can be used to clamp de-dirt paper or wipe (not shown) for cleaning. The rounded pivot 11 facilitates the rotation of the panel 12 to clean dirt at dead space.

However, in above-mentioned mop using de-dirt paper, the mop can only be used to clean dirt and can not be used to clean pests such as flea and louse.

**Summary of the invention**

It is one object of the present invention to provide a retaining structure for brush of vapor cleaner, wherein the vapor cleaner is combined with a mop using de-dirt paper. The brush of vapor cleaner can freely rotate to provide wide range cleaning and the high temperature vapor from the vapor cleaner can kill pests such as flea and louse.

It is another object of the present invention to provide a retaining structure for brush of vapor cleaner, wherein retaining structure does not require thermal resistant material to reduce cost.

To achieve above object, the present invention provides a retaining structure for brush of vapor cleaner comprising a sheath pipe, a coupling means, a duct, a rotation means, a plurality of connection units, an upper cover and a bottom plate. The sheath pipe is connected to a connection tube of the vapor cleaner. The sheath pipe has a coupling means connected to the duct. The top of the rotation means is pivotally connected to the sheath pipe. Both sides of the rotation means are pivotally connected to the upper cover and the top cover is screwed to the bottom plate.

The various objects and advantages of the present invention will be more readily understood from the following detailed description when read in conjunction with the appended drawing, in which:

**Brief description of drawing:**

Fig. 1 shows the perspective view of prior art mop using de-dirt paper;

Fig. 2 shows the exploded view of the present invention;

Fig. 3 shows the perspective view of the present invention;

Fig. 4 shows the sectional view of the present invention; and

Fig. 5 shows the application of the present invention.

**Detailed description of the invention**

With reference now to Figs. 2, 3, 4 and 5, the present invention is intended to provide a retaining device for brush of vapor cleaner. The retaining device is arranged at front end of the vapor cleaner and can be used to clamp de-dirt paper or wipe for cleaning. The retaining device comprises a sheath pipe 20, a coupling means 22, a duct 30, a rotation means 40, a plurality of connection units 50, an upper cover 60 and a bottom plate 70.



The sheath pipe 20 is integrally formed by ejection molding and is of hollow shape. The sheath pipe 20 has two openings 21 and 211 on both ends thereof as shown in Figs. 2. The opening 211 at top of the sheath pipe 20 is connected to a connection tube 80 (as shown in Fig. 4) of a vapor cleaner (not shown). The connection tube 80 has a conveying tube 81 for conveying the vapor generated by the vapor cleaner. The opening 21 at the bottom of the sheath pipe 20 has grooves 24 on both sides thereof and pivotally connected to the rotation means 40, as shown in Fig. 3.

The sheath pipe 20 contains a coupling means 22, which is of hollow shape to conduct the vapor produced by the vapor cleaner. One end of the coupling means 22 is connected to the duct 81 as shown in Fig. 4. One end of the coupling means 22 has an annulus loop 221 to enhance the coupling force between the coupling means 22 and the conveying tube 81 and prevent detach of the coupling means 22 from the conveying tube 81.

With reference to Fig. 4, the coupling means 22 has a conic part 222 and a guiding groove 223. The conic part 222 pierces a clamping board 23 in the sheath pipe 20 and guides the clamping board 23 into the guiding groove 223 such that the coupling means 22 is fixed in the clamping board 23.

The coupling means 22 has a ring 224, the outer end of the ring 224 abuts the inner wall of the sheath pipe 20, as shown in Fig. 4. The ring 224 prevents the coupling means 22 from being inclined in the sheath pipe 20. Another end of the coupling means 22 is invaginated with a first tightening ring 225 and the duct 30. The first tightening ring 225 enhances the coupling force between the coupling means 22 and the duct 30 and prevents detach of the coupling means

22 from the duct 30.

The duct 30 is made of flexible rubber and is of hollow shape to convey vapor therein. One end of the duct 30 is connected to the coupling means 22 as shown in Fig. 4 and another end of the duct 30 is invaginated with a second  
5 tightening ring 226 and a nozzle 71. The second tightening ring 226 enhances the coupling force between the nozzle 71 and the duct 30 and prevents detach of the nozzle 71 from the duct 30.

The rotation means 40 encloses outer wall of the duct 30 as shown in Fig. 4 and the top end of the rotation means 40 is pivotally connected to the grooves  
10 24 on both sides of the sheath pipe 20 whereby the sheath pipe 20 and the connection tube 80 can swing forward and backward to clean dead space as shown in Fig. 5.

The rotation means 40 is composed of a first semi-body 41 and a second semi-body 42, which enclose the outer wall of the duct 30 after assembling  
15 thereof. The first semi-body 41 has a first pivot shaft 411 and the second semi-body 42 has a second pivot shaft 421. The first pivot shaft 411 and the second pivot shaft 421 are pivotally connected to the grooves 24 of the sheath pipe 20.

The first semi-body 41 of the rotation means 40 has a dent 413 and the  
20 second semi-body 42 has a dent 423. The two dents 413 and 423 together cover the outer wall of the duct 30 at center of the two semi-bodies 41 and 42.

The first semi-body 41 of the rotation means 40 has two third pivot shafts 412 on both sides thereof, the second semi-body 42 of the rotation means 40 has two fourth pivot shafts 422 on both sides thereof. The third pivot shafts 412

and the fourth pivot shafts 422 are pivotally arranged in lug 61 of the upper cover 60, whereby the upper cover 60 connected to the rotation means 40 can swing laterally.

The upper cover 60 is integrally formed by mold injection and has two  
5 lugs 61 extended therefrom. The two lugs 61 are oppositely arranged on the upper cover 60 and have coupling grooves 611 therein. The coupling grooves 611 are pivotally connected to the third pivot shafts 412 and the fourth pivot shafts 422.

The upper cover 60 has a plurality of recesses 62 in which the connection  
10 units 50 are fixed. The recesses 62 contain threaded hole 621 and a plurality of clamping grooves 622. The threaded hole 621 can be used with screw 623 to fix the bottom plate 70. The clamping grooves 622 are locked with a plurality of hooking grooves 52 on bottom of the connection units 50. The hooking  
grooves 52 enhance the coupling force between the connection units 50 and the  
15 upper cover 60 and prevent detach of the connection units 50 from the upper cover 60.

The connection unit 50 is integrally formed by mold injection and has a slit 51 on topside thereof. The slit 51 is used to clamp de-dirt paper or wipe for cleaning dirt. The connection unit 50 has a plurality of hooking grooves 52 on  
20 bottom thereof, which are hooked to the clamping grooves 622 and prevent detach of the connection units 50 from the upper cover 60.

The bottom plate 70 is integrally formed by mold injection and has a rounded hole 72 and a plurality of posts 73. The posts 73 are corresponding to the threaded holes 621 in the recesses 62. The posts 73 have threads 731 therein

and the threads 731 are corresponding to the screws 623.

The bottom plate 70 has a concave room 74 and a plurality of orifices 741 as shown in Fig. 4. The concave room 74 can be used to accommodate the nozzle 71 and prevent the jam of the orifices 741 of the nozzle by paper or  
5 wipe.

The bottom plate 70 has a plurality of orifices 741 on one side thereof to increase the spraying area of vapor and send the high-temperature vapor to the nozzle 71 through the coupling means 22 and the conveying tube 81. The vapor is emitted from the nozzle 71 and then uniformly through the plurality of  
10 orifices 741 on the bottom plate 70.

The nozzle 71 can be made by metal or plastic and is locked with the rounded hole 72. The nozzle 71 is retained by the second tightening ring 226 and coupled to the duct 30, thus forming a complete retaining structure for brush of vapor cleaner as shown in Fig. 3.

15 As shown in Fig. 5, in the present invention, the high-temperature vapor is sent to the nozzle 71 through the coupling means 22 and the conveying tube 81. The vapor is emitted from the nozzle 71 and then uniformly through the plurality of orifices 741 on the bottom plate 70. The high-temperature vapor has the effect of cleaning pests such as flea and louse.

20 Although the present invention has been described with reference to the preferred embodiment thereof, it will be understood that the invention is not limited to the details thereof. Various substitutions and modifications have suggested in the foregoing description, and other will occur to those of ordinary skill in the art. Therefore, all such substitutions and modifications are intended

to be embraced within the scope of the invention as defined in the appended claims.

**I claim**

1. A retaining structure for brush of vapor cleaner, comprising  
a sheath pipe of hollow shape and having a clamping board therein;  
a coupling means arranged within the sheath pipe and being of hollow  
5 shape, the coupling means having a conic part and a guiding groove; the conic  
part piercing the clamping board in the sheath pipe and the guiding groove  
clamping the clamping board;  
a duct having one end connected to the coupling means;  
a rotation means composed of two semi-bodies, which enclose an outer  
10 wall of the duct, the rotation means having a top end pivotally connected to a  
bottom end of the sheath pipe;  
an upper cover having two lugs on topside thereof and pivotally connected  
to the rotation means; and  
a bottom plate assembled with the upper cover.
- 15 2. The retaining structure for brush of vapor cleaner as in claim 1, wherein  
the sheath pipe has an opening at top end thereof and connected to a connection  
tube and a conveying tube of the vapor cleaner to convey vapor from the vapor  
cleaner.
- 20 3. The retaining structure for brush of vapor cleaner as in claim 1, wherein  
the coupling means has one end invaginated with an annulus loop to enhance  
the coupling force between the coupling means and the conveying tube and  
prevent detach of the coupling means from the conveying tube.
4. The retaining structure for brush of vapor cleaner as in claim 1, wherein  
the coupling means has a ring abutting an inner wall of the sheath pipe, thus

preventing the coupling means from being inclined in the sheath pipe.

5        5. The retaining structure for brush of vapor cleaner as in claim 1, wherein one end of the coupling means is invaginated with a first tightening ring, the first tightening ring enhancing the coupling force between the coupling means and the duct and preventing detach of the coupling means from the duct.

6. The retaining structure for brush of vapor cleaner as in claim 1, wherein another end of the duct is invaginated with a second tightening ring and a nozzle, the second tightening ring enhancing the coupling force between the nozzle and the duct and preventing detach of the nozzle from the duct.

10       7. The retaining structure for brush of vapor cleaner as in claim 1, wherein the upper cover has a plurality of recesses in which the connection units are fixed, and the connection unit has a slit on topside thereof, the slit used to clamp de-dirt paper or wipe for cleaning dirt.

15       8. The retaining structure for brush of vapor cleaner as in claim 1, wherein the bottom plate has a rounded hole to lock the nozzle through vapor is emitted.

9. The retaining structure for brush of vapor cleaner as in claim 1, wherein the bottom plate has a concave room used to accommodate the nozzle and prevent the jam of the nozzle.

20       10. The retaining structure for brush of vapor cleaner as in claim 1, wherein the bottom plate has a plurality of orifices on one side thereof to increase the spraying area of high-temperature vapor and make uniform vapor emission.



INVESTOR IN PEOPLE

Application No: GB 0115695.9  
Claims searched: 1 to 10

Examiner: Matthew Clarke  
Date of search: 17 August 2001

## Patents Act 1977 Search Report under Section 17

### Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.S): A4F (FSNS, FSNX, QG, FQL) A5G (GD)

Int Cl (Ed.7): A47L (9/24, 11/34, 11/40, 13/22, 13/24, 13/256)

Other: Online: WPI, EPODOC, PAJ

### Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
A	US 4971471 (SLOAN) see whole document	

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
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